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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/037,304	12/31/2001	Huanong Zhang	X02.12-0001	4512

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EXAMINER
ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
1745	8

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/037,304	ZHANG, HUANONG	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the c ver sheet with the corresp ndence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *10-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 December 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *01 May 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I (claims 1-9) in Paper No. 7 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Oath/Declaration

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

> The oath or declaration is defective because:
> It does not identify the mailing or post office address of each inventor. A mailing or post office address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing or post office address should include the ZIP Code designation. The mailing or post office address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

Drawings

4. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 05/01/02 has been accepted. A proper drawing correction or corrected drawings are required

in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 3c and 4c. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 30 and 40. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "3a" has been used to designate a) "the head" (page 9), b) "the side" (page 5) and c) "the edge" (page 8). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: *it is noted that the specification at page 9 (line 23-24) makes reference to "a notch 8" shown in Figure 8, however, Figure 8 does not illustrate "the notch 8"*. A proposed drawing correction or corrected drawings

are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

9. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: *it is noted that the specification at page 7 (lines 15-25) makes reference to "a battery case 1" and "a post or terminal 2" which are shown in Figure 7, however, Figure 7 illustrates neither "the battery case 1" nor "the post or terminal 2"* . A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

10. Claim 1 is objected to because of the following informalities: the capital letter of the term "*F*olding" (line 5) should changed to a non-capital letter fashion (i.e. folding). Appropriate correction is required.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

13. Claim 1 recites the limitation "*the plates*" in line 5; "*the positive and negative plates*" in line 5; "*a plate*" in line 6. There is insufficient antecedent basis for this limitation in the claim. It is uncertain as to how many plates the instant claims are intended to recite.

14. Claim 7 recites the limitation "the plate grid" in line 30. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Bakos et al 4761352.

The instant claims are directed to a method for assembling a battery element group wherein the claimed inventive concept comprises the specific folding of the plates. Other limitations include the specific folding shape, the notches, the division, and the specific plate material.

As to claim 1:

Bakos et al disclose an accordian folded electrode assembly and a method for making the electrode assembly (TITLE and COL 1, lines 5-7).

The invention relates to an electrode assembly, a method for making the electrode assembly and electrochemical cells in which the electrode assembly is used. 5

Figures 3, 4 and 5 below show the electrode assembly wherein the method for assembling the same including folding the entire anode over the entire cathode to form an alternately laminate structure in which the cathode 1 is sandwiched between the folds of the anode 11 (COL 3, lines 1-6). It is further disclosed that the invention works equally well when the separator is placed over the cathode (COL 2, lines 45-48).

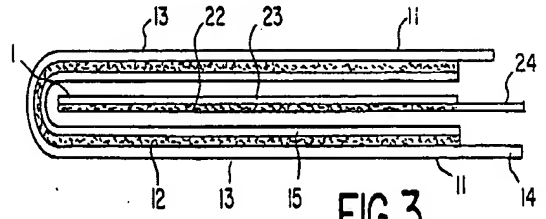
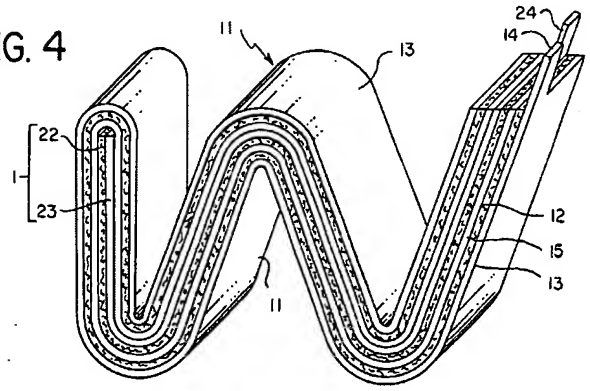


FIG. 3

FIG. 4



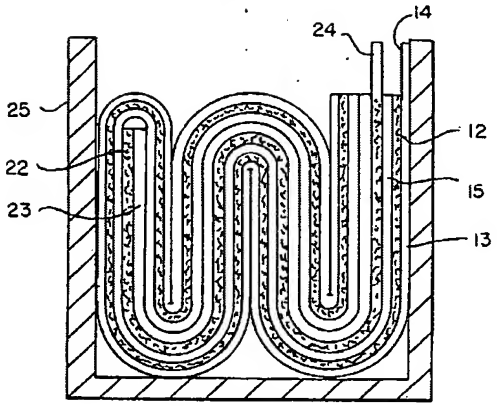


FIG. 5

As to claims 2 and 6:

Figures 3, 4 and 5 above illustrate one plate being folded into a continuous S-shape along with the separator integrally, and the other plate being sandwiched (*inserted*) in the laminated area (COL 3, lines 1-6).

As to claim 3:

Figures 3, 4 and 5 above also depict the plate having a continuous S-shape folded plate and the notches (*the V-shaped indentation or fold*) provided at the cross-positions of the two plates (COL 3, lines 7-19).

As to claim 4:

It is disclosed that the anode plate is essentially a three piece laminate comprised of lithium coated on a SS foil current collector (COL 2, lines 21-25); and the cathode is a laminate comprised of a SS grid current collector coated on one or both sides (COL 2, lines 53-56). *Thus, the active material is pasted on the plate grid.*

As to claim 7:

It is disclosed that a portion of the SS foils current collector is trimmed to form the anode terminal (COL 2, lines 24-26). *It is noted that trimming encompasses to make trim by cutting or clipping.* It is also disclosed that a small portion of the SS current collector is shaped at one end to function as a cathode terminal (COL 2, lines 57-60). *It is thus noted that shaping encompasses to give a particular form.* It is further disclosed that the total length and thickness of the anode will be dictated by the loading requirements of the electrochemical cell or battery specification under consideration (COL 2, lines 49-53). It is also disclosed that the length of each leg in the fold and the anode of folds and legs will be determined by the dimensions of the container in

which the electrode assembly is to be inserted (COL 3, lines 12-18). *Thus, the plates are inherently processed or worked on as well as cut into a desired length and width.*

As to claim 8:

It is disclosed that the metal foils which can be used as the current collector include metals such as nickel and stainless steel (SS) (COL 2, lines 40-44). *It is noted that stainless steel is an alloy of steel with chromium and another element as nickel.*

As to claim 9:

It is disclosed that the current collectors are either a metal foil or grid (COL 2, lines 24-25 and COL 2, lines 53-55). *It is noted that a grid is a perforated metal plate and/or a plate consisting of a mesh or a spiral of fine wire.* Thus, the claims are anticipated.

17. Claims 1-2, 6-7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Blondel et al 3663721.

As for claims 1-2 and 6:

Blondel et al disclose a procedure for production of electrochemical cells wherein the anode is prepared by cold extrusion into a sheet form; the extruded sheets are severed into prescribed band lengths and the bands are pleated in zigzag form to provide multiple folds or pleats. Thin cathode plates are positioned between pleats, being insulated from the pleated lithium anode by suitable separating means (ABSTRACT/COL 1, lines 40-50).

> The cell according to the invention embodies a lithium anode in form of a lithium band zig-zag-wise folded or pleated several times upon itself, several thin cathode plates being placed in the pleats or folds thus created and being insulated from the said anode by suitable separating means, the dimension of each of the said cathode plates parallel to the width of the anode band being smaller than said width so that a zone stretching lengthwise along at least one edge of the pleated band has no opposite cathode counterpart, electrical connection means being fastened in the said zone to said anode band.

Figure 4 below illustrates the assembled battery group wherein the anode plate is folded; the positive and negative plate alternately arranged, the cathode plate being inserted into a laminated area of the anode plate and the separator.

The lithium anode 15 provided with its electrical connection means is slipped into the separator sheath through its open mouth S². Then the assembled anode and sheath are zig-zag-wise folded or pleated on a master gauge and cathode plates are placed between the adjacent pleats resulting from the zig-zag folding as illustrated in FIG. 4.

FIG. 4 diagrammatically shows a perspective view with broken-away portions of part of the unit of anode and cathode plates; however, the sheath shaped separator S enclosing the anode 15 and the electrical connection means associated with the cathodes have not been shown in this figure for clarity's sake.

The anode 15 provided with its electrical connection means 16, 17 is made by folding or pleating the plate 15 of FIG. 3 enveloped in sheath S upon itself. Between each pair of pleats is placed a cathode plate 18 having the shape of a thin substantially rectangular plate. A cell may thus be constituted by folding the anode eight times in order to constitute seven folds and placing seven cathode plates in the pleats between these folds.

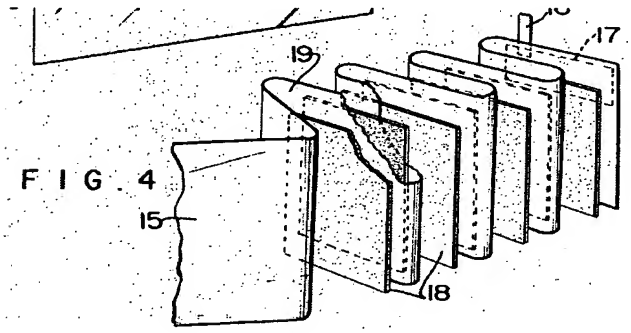


FIG. 4

With respect to claim 7:

It is disclosed that the zigzag folded anode is made by cold extrusion of a lithium ingot to a form a lithium band by means of a suitable extruding apparatus (COL 2, lines 35-40). The lithium ingot is placed in the die holder and pressed toward the die-plate (COL 2, lines 40-45). It is further disclosed that the extruded lithium band is then cut to the desired plate length for making an anode plate (COL 3, lines 2-5).

As to claim 9:

It is disclosed that the anode has a plate form (COL 3, lines 2-5).

Thus, the claims are anticipated.

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bakos et al 4761352 as applied to claim 3 above, and further in view of Pyszczek et al 5468569.

Bakos et al is applied, argued and incorporated herein for the reasons above. However, Bakos et al do not expressly disclose the plate grid divided into two halves at the notch per se.

Pyszczek et al disclose a method for manufacturing electrochemical cells including configuring the standard electrodes by folding one or more of the standard electrode (ABSTRACT) wherein the anode and cathode are first folded in half ton reduce their overall length; wherein the cathode 21 is folded at a location about one half the distance between the ends thereof, thereby folding it upon itself, and in half to reduce its electrochemical surface by 50 % (COL 4, lines 38-50); and an anode 17 being folded at a location about one half the length thereof, thereby folding it upon itself, and in half, to reduce its electrochemical surface by 50 %. Although the fold of anode 17 results in folded anode 39 having about half the length of anode 17, relatively the same amount of anode active material is maintained in association with the cathode by folding the anode 17 (COL 4, lines 52-65).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the plate grid divided into two halves at the notch per se of

Pyszczek et al in the electrode assembly of Bakos et al as Pyszczek et al teach that by folding both the anode and the cathode at a location about one half the distance between the ends thereof, the electrochemical surface of the both the anode and the cathode is reduced by 50 %. Accordingly, Pyszczek et al's method of folding the electrode assembly achieve configuring a standard electrode having a high electrochemical surface to one having a low electrochemical surface; and thus, it provides a method for configuring standard electrodes of uniform geometries than can be used for cells either having a high or low electrochemical surface.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745